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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WERNER, BRIAN P

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/980,888

Applicant(s)

SATO ET AL.

Examiner

Brian P. Werner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: .

DETAILED ACTION

Drawings

1. Figures 22-24 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: Specification page 8, line 18, "Aa, Ab, Ac" should be Δa , Δb and Δc in accordance with figure 2A. Appropriate correction is required.

Claim Objections

3. Claims 5 and 7 are objected to because of the following informalities: In claim 5, in line 2, "dispose" should be "disposed". Regarding claim 7, it appears that the claim should depend directly from claim 1 in the same manner that claim 18 (which is equivalent to claim 7) depends directly from independent claim 9. This assumption is made because claim 7 defines another distinct disclosed embodiment of image pickup apparatus from that of claim 5, from which it currently depends. Correction or clarification is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. While independent claim 1 will be exemplified, independent claim 9 recites equivalent limitations.

Claim 1 recites the two steps of “moving” an image and “adjusting a position of an object” in the image. It is not clear from the claim, particularly when read in light of the specification disclosure, if these two claimed steps correspond to the same step, or if they are completely different. That is, it is not clear whether the “moving” step corresponds to moving the image capture device, or whether the image is moved by image processing as follows:

The specification, at page 8, describes how the “camera 1 is moved parallel as shown in FIG. 1B”. This corresponds to physically moving the camera in order to capture images from different (i.e., stereoscopic) vantage points as depicted in figures 1A and 1B.

The specification, at page 8, also describes how “the image 32 is moved in the cross direction to obtain a corrected image (shift image) 40”. This corresponds to the moving, or shifting, the image using an image processor as depicted in figure 3A.

Specification pages 8 and 9 equate the aforementioned image moving (i.e., shifting as depicted in figure 3A) with the adjustment of the fusion positions of objects (refer to specification page 9, lines 16-19).

Thus, turning to claim 1 again, it is not clear whether the claimed "moving" and "adjusting" steps are one and the same (i.e., corresponding to figure 3A), or whether the claimed "moving" step in fact corresponds to the actual camera movement (i.e., as depicted in figures 1A and 1B). Because these claimed steps are separated by an "and" at line 5, the examiner will interpret them as separate steps, where the "moving" corresponds to the physical movement of a camera position for taking two images at different vantage points.

Because of this uncertainty, and because an assumption must be made regarding claim interpretation, this problem rises to the level of a 35 USC 112 second paragraph rejection and requires clarification.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Imsand (US 4,647,965 A) and Sundahl et al. (US 6,094,215 A).

The Imsand Reference:

Regarding claims 1 and 9, Imsand discloses a method comprising:

moving one of a first image picked up with a pickup apparatus in a first state and a second image picked up with the pickup apparatus in a second state different from the first state¹ ("stereoscopic cameras" in figure 2; first and second images are picked by two different cameras in different states; i.e., displaced from one another and at different angles as depicted; this naturally results in the images being moved with respect to one another which is the basis for stereoscopic viewing); and

adjusting a position of fusion of an object designated in the first and second images (figure 2, numeral 216; "Repositioning of object images in one or both pictures ... within a viewer's limit of binocular fusion with normal eye convergence" at column 6, lines 1-6) to generate a stereoscopic image (figure 2, numeral 220).

Regarding claim 9 specifically, Imsand's processor at figure 2, numeral 216, performs the aforementioned adjustment of position of fusion and thus meets the requirements of the claimed "moving means". Applicant's disclosed structure corresponding to the claimed moving means is a processor at applicant's figure 9, numeral 63. Given that Imsand's structure is also a processor (i.e., at figure 2, numeral 216), the structures are equivalent.

Regarding claim 11, Imsand discloses a shift amount setting means for setting a shift amount of the first and second images (shift amounts are set by Imsand as follows: "camera pixel is shifted to the right, closer to its corresponding left camera pixel" at

¹ Refer to the 112, second paragraph rejection above for the examiner's interpretation of this limitation.

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column 6, line 35, where “the object images are positioned so that the required convergence angles increase as the objects get closer” at column 6, line 47; the structure disclosed by Imsand matches the structure disclosed by applicant, as both comprise digital circuitry).

Regarding claim 12, Imsand discloses a mode selecting means for selecting a shift mode (“repositioning object images in one o both of the two stereo pictures” at column 4, line 49 and column 6, line 1; the structure disclosed by Imsand matches the structure disclosed by applicant, as both comprise digital circuitry).

Differences:

While Imsand is open to “variations of the above system” with respect to the image pickup apparatus (i.e., column 5, lines 57-58):

Regarding claims 1 and 9, Imsand does not teach a single image pickup apparatus (i.e., a single camera) picking up both images, with the image pickup apparatus being in a different state when picking up the second image.

Regarding claims 2 and 13, Imsand does not teach parallel movement of the pickup apparatus.

Regarding claims 3 and 14, Imsand does not teach rotational movement of the pickup apparatus.

Regarding claim 10, Imsand does not discloses a frame image generating means generating a frame image based on the moved at least one of the first and second images.

Regarding claims 4 and 15, Imsand does not disclose the pickup apparatus as having a condenser type optical means disposed between an image pickup element and a target object, movable to any position holding an optical axis parallel to the pickup element.

The Sundahl Reference:

Regarding claims 1 and 9, Sundahl discloses a system in the same field of stereoscopic image processing, where he addresses the same area of 3D image capture, wherein Sundahl teaches a single image pickup apparatus (figure 1, numeral 104; "single camera" at column 2, line 12) picking up both images (as depicted in figure 1), with the image pickup apparatus is in a different state when picking up the second image ("second location" at column 1, line 58).

Regarding claims 2 and 13, Sundahl teaches parallel movement of the single image pickup apparatus ("lateral translation illustrated by arrow 120" at column 2, line 45).

Regarding claims 3 and 14, Sundahl teaches rotational movement of the single image pickup apparatus ("may include a rotation motion illustrated by arrow 124" at column 2, line 46).

Regarding claim 10, Sundahl teaches a frame image generating means (figure 1, numeral 136) generating a frame image based on the moved at least one of the first and second images ("The digital image is stored in memory device 136" at column 3, line 41;

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this is equivalent to applicant's disclosed structure which is also a memory at applicant's figure 9, numerals 61 and 62).

Regarding claims 4 and 15, Sundahl teaches the pickup apparatus as having a condenser type optical means (the digital camera depicted in figure 1 has a lens; a condenser lens is a converging lens, which is the type of lens used by cameras) disposed between an image pickup element ("CCD" at column 3, line 33) and a target object (figure 1, numeral 108), movable to any position holding an optical axis parallel to the pickup element (the optical axis of digital cameras have a fixed relationship with the CCD; even when the camera is moved from the first to the second position, and even if the lens is focused, the optical axis remains fixed).

The Combination:

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize a single image pickup apparatus as taught by Sundahl, in place of the two cameras of Imsand, in order to capture both images by repositioning the single camera as taught by Sundahl. One of ordinary skill would be motivated to make this substitution in order to simplify and thus reduce to cost of the two-camera image pickup apparatus of Imsand (i.e., "the problem with using two cameras is that it is more expensive than a single camera arrangement" at Sundahl column 1, line 35).

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8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Imsand (US 4,647,965 A) and Sundahl et al. (US 6,094,215 A) as applied to claim 10 above, and further in view of Tabata et al. (US 5,825,456 A).

Even if the Imsand and Sundahl combination did not teach a shift amount setting means for setting a shift amount of the first and second images, Tabata discloses a system in the same field of stereoscopic image processing, and same area of adjusting shift amounts between two stereoscopic images ("image shifting means" at column 3, line 37), comprising a shift amount setting means (figure 8, numeral 37) for setting a shift amount of the first and second images ("A direction and an amount of shift are derived from a detected eye point" at column 7, line 67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to incorporate a shift amount setting means, as taught by Tabata, into the shift means for adjusting a position fusion and into the display of the Imsand and Sundahl combination (i.e., Imsand figure 2, numeral 216 and 220), in order to properly set the shift amount based on a "detected eye point" (Tabata, column 7, line 67) and "thus the image sift may be carried out stably and suitably" (Tabata, column 8, line 30).

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9. Claims 1, 5, 6, 9, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Imsand (US 4,647,965 A) and Pritchard et al. (US 5,157,484 A).

The Imsand Reference:

Regarding claims 1 and 9, Imsand discloses a method comprising:

moving one of a first image picked up with a pickup apparatus in a first state and a second image picked up with the pickup apparatus in a second state different from the first state² ("stereoscopic cameras" in figure 2; first and second images are picked by two different cameras in different states; i.e., displaced from one another and at different angles as depicted; this naturally results in the images being moved with respect to one another which is the basis for stereoscopic viewing); and

adjusting a position of fusion of an object designated in the first and second images (figure 2, numeral 216; "Repositioning of object images in one or both pictures ... within a viewer's limit of binocular fusion with normal eye convergence" at column 6, lines 1-6) to generate a stereoscopic image (figure 2, numeral 220).

Differences:

While Imsand is open to "variations of the above system" with respect to the image pickup apparatus (i.e., column 5, lines 57-58):

² Refer to the 112, second paragraph rejection above for the examiner's interpretation of this limitation.

Regarding claims 1 and 9, Imsand does not teach a single image pickup apparatus (i.e., a single camera) picking up both images, with the image pickup apparatus being in a different state when picking up the second image.

Regarding claims 5 and 16, Imsand does not teach an angle controlling means disposed between a pickup element and a target object controlling an outgoing angle of light emitted to a pickup face of the pickup apparatus where the first and second states are controlled by first and second angles of the angle controlling means.

Regarding claims 6 and 17, Imsand does not teach the angle controlling means as comprising a variable apex-angle prism.

The Pritchard Reference:

Regarding claims 1 and 9, Pritchard discloses a system in the same field of stereoscopic image processing, where he addresses the same area of 3D image capture, wherein Pritchard teaches a single image pickup apparatus (figure 11; "single camera" at column 10, line 25) picking up both images (as depicted in figure 10, by axes 136 and 135), with the image pickup apparatus is in a different state when picking up the second image (in a first state to pick up the first image, the "shifter 131 is not rotated" and in the second state, the "shifter 131 is rotated" at column 12, lines 1-3).

Regarding claims 5 and 16, the angle controlling means disposed between a pickup element and a target object (as depicted in figure 10) controlling an outgoing angle of light emitted to a pickup face of the pickup apparatus (as depicted by the axes 136 and 135 in figure 10) where the first and second states are controlled by first and

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second angles of the angle controlling means (in a first state to pick up the first image, the “shifter 131 is not rotated” and in the second state, the “shifter 131 is rotated” at column 12, lines 1-3).

Regarding claims 6 and 17, Imsand does not teach the angle controlling means as comprising a variable apex-angle prism (figure 10, numeral 131 is a prism in that it bends light, where its apex angle is variable by rotation as described above and depicted in the figure).

The Combination:

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize a single image pickup apparatus as taught by Pritchard, in place of the two cameras of Imsand, in order to capture both images by repositioning the incoming light angle as taught by Pritchard (i.e., at figure 10). One of ordinary skill would be motivated to make this substitution in order to simplify the image pickup apparatus by obviating the problems associated with a two camera system, such as “constant alignment adjustment” (Pritchard, column 3, line 33), the requirement for a “good deal of operator skill” (Pritchard, column 3, line 27), and the need for a “special mount to hold two cameras ... [which] makes it large and heavy” (Pritchard, column 3, line 38).

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10. Claims 1, 7, 8, 9, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Imsand (US 4,647,965 A) and Lia (US 5,222,477 A).

The Imsand Reference:

Regarding claims 1 and 9, Imsand discloses a method comprising:

moving one of a first image picked up with a pickup apparatus in a first state and a second image picked up with the pickup apparatus in a second state different from the first state³ ("stereoscopic cameras" in figure 2; first and second images are picked by two different cameras in different states; i.e., displaced from one another and at different angles as depicted; this naturally results in the images being moved with respect to one another which is the basis for stereoscopic viewing); and

adjusting a position of fusion of an object designated in the first and second images (figure 2, numeral 216; "Repositioning of object images in one or both pictures ... within a viewer's limit of binocular fusion with normal eye convergence" at column 6, lines 1-6) to generate a stereoscopic image (figure 2, numeral 220).

Differences:

While Imsand is open to "variations of the above system" with respect to the image pickup apparatus (i.e., column 5, lines 57-58):

³ Refer to the 112, second paragraph rejection above for the examiner's interpretation of this limitation.

Regarding claims 1 and 9, Imsand does not teach a single image pickup apparatus (i.e., a single camera) picking up both images, with the image pickup apparatus being in a different state when picking up the second image.

Regarding claims 7 and 18, Imsand does not teach a light transmitting means with a light entering face and a light exiting face formed parallel to each other and arranged on a path between a pickup element and a target object to be insertable at a predetermined angle, where in a first state the light transmitting means fails to be inserted on the path and in a second state, the light transmitting means is inserted in the path.

Regarding claims 8 and 19, Imsand does not teach the light transmitting means as comprising a transparent parallel plate.

The Lia Reference:

Regarding claims 1 and 9, Lia discloses a system in the same field of stereoscopic image processing, where he addresses the same area of 3D image capture, wherein Lia teaches a single image pickup apparatus (figure 6, numeral 22) picking up both images (as depicted by the optical path division depicted in figures 2 and 4; e.g., in figure 2, the right image is picked up and in figure 4, the left image is picked up), with the image pickup apparatus is in a different state when picking up the second image (the left and right shutters of numeral 30 are open and closed in the different states as depicted in figures 2 and 4).

Regarding claims 7 and 18, Lia teaches a light transmitting means with a light entering face and a light exiting face formed parallel to each other (figure 2, numeral 26)

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and arranged on a path between a pickup element and a target object (numeral 26 is “disposed at the distal end of the camera 21” at column 3, line 58) to be insertable at a predetermined angle (numeral 26 is at a fixed angle, and is insertable into the optical path when the shutters 30 are opened and closed), where in a first state the light transmitting means fails to be inserted on the path (e.g., in figure 2, the left shutter is closed) and in a second state, the light transmitting means is inserted in the path (e.g., figure 4, the left shutter is opened, thus inserting the plate 26 into the optical path).

Regarding claims 8 and 19, Imsand does not teach the light transmitting means as comprising a transparent parallel plate (plate 26 in figure 2 is a window, having parallel entry and exit surfaces as depicted; it is also transparent; i.e., “A transparent face plate 26” at column 3, line 57).

The Combination:

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize a single image pickup apparatus as taught by Lia, in place of the two cameras of Imsand, in order to capture both images by selectively inserting the window into the optical path as taught by Lia (i.e., at figures 2 and 4), in order to simplify the image pickup apparatus by obviating the problems associated with a two camera system, such as the “manufacturing” problems (Lia, column 1, line 37; the “cost” (Lia, column 3, line 40), the matching and alignment (Lia, column 3, line 43) and bulk and weight associated with two cameras (Lia, column 1, lines 48-49).

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Conclusion

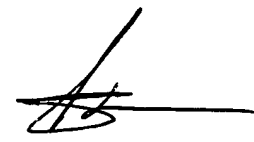
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsujiuchi et al. (US 4,895,431 A) is pertinent as teaching a single camera method of obtaining stereoscopic images (i.e., figures 1, 2, 29 and 30).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Werner whose telephone number is 703-306-3037. The examiner can normally be reached on M-F, 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on 703-305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

Brian Werner
Patent Examiner
Thursday, August 21, 2003



**BRIAN WERNER
PRIMARY EXAMINER**